Product Design & Development

Identifying Customer Needs
Concept Development Process

Mission Statement

Identify Customer Needs

Establish Target Specifications

Generate Product Concepts

Select Product Concept(s)

Test Product Concept(s)

Set Final Specifications

Plan Downstream Development

Development Plan

Perform Economic Analysis

Benchmark Competitive Products

Build and Test Models and Prototypes
The goals of the method

• Ensure that the product is focused on customer needs
• Identify latent and hidden needs as well explicit needs
• Provide a fact base for justifying the product specifications
• Create an archival record of the needs activity of the development process
• Ensure that no critical customer need is missed or forgotten
• Develop a common understanding of customer needs among members of the development team
Customer Needs Process

• Define the Scope
  – Mission Statement
• Gather Raw Data
  – Interviews
  – Focus Groups
  – Observation
• Interpret Raw Data
  – Need Statements
• Organize the Needs
  – Hierarchy
• Establish Importance
  – Surveys
  – Quantified Needs
• Reflect on the Process
  – Continuous Improvement
Identifying Customer Needs

Involves:

– Identifying latent or hidden needs as well as explicit needs

– Producing a “fact base” justifying product specifications

– Recording needs-relating activities
  (since PDD often involves going “back to square one”)
Identifying Customer Needs (cont)

– Ensuring that no critical customer need is missed or forgotten
– Developing a common understanding of customer needs among PDD team members

Note: Team members must experience product use in normal product environment
Perform Economic Analysis

Benchmark Competitive Products

Build and Test Models and Prototypes
Other terms for ‘customer needs’:
  – Customer attributes
  – Customer requirements
Customer Needs Process

• Define the Scope
  – Mission Statement

• Gather Raw Data
  – Interviews
  – Focus Groups
  – Observation

• Interpret Raw Data
  – Need Statements

• Organize the Needs
  – Hierarchy

• Establish Importance
  – Surveys
  – Quantified Needs

• Reflect on the Process
  – Continuous
Customer Needs Example: Cordless Screwdrivers
Scope of Effort (product planning)

Mission Statement

– Specifies direction to go but not the precise destination or a particular way to proceed.
Mission Statement

May include:

– Brief (one-sentence) product description stating key customer benefits
  … but not product concept

– Key business goals:
  • Timing of new product introduction, market share targets, and desired financial performance.
Mission Statement (cont)

• Target market(s).
  – There may be several.
    Identify primary and secondary markets.

• Assumptions constraining devoted effort:
  – Although these may restrict generation of product concepts they can help to maintain a manageable product scope.
Mission Statement (cont)

• Stakeholders:
  – All ‘players’ who will be influenced by the product:
    • end users
    • sales force
    • production department
    • service department, etc.
Mission Statement for the Screwdriver

**Product Description**
- A hand-held, power-assisted device for installing threaded fasteners

**Key Business Goals**
- Product introduced in 4th Q of 2000
- 50% gross margin
- 10% share of cordless screwdriver market by 2004

**Primary Market**
- Do-it-yourself consumer

**Secondary Markets**
- Casual consumer
- Light-duty professional

**Assumptions**
- Hand-held
- Power assisted
- Nickel-metal-hydride rechargeable battery technology

**Stakeholders**
- User
- Retailer
- Sales force
- Service center
- Production
- Legal department
Gathering Raw Customer Data

• Interviews:
  – One or more development team members discuss needs with a single customer.
    … usually in customer’s environment
    … typical duration: one hour

• Focus groups:
  – A moderator facilitates discussions (say, two hours) with a group of customers (say, 8 to 12)
How Many Customers?

Gathering Raw Customer Data

- Observing the product in use:
  - Watching customers use an existing product or perform a task for which a new product is intended
  ... can reveal important details about customer needs
Choosing Customers
(…back to the screwdriver)

<table>
<thead>
<tr>
<th></th>
<th>Lead users</th>
<th>Users</th>
<th>Retailer or Sales Outlet</th>
<th>Service Centers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homeowner (occasional use)</td>
<td>0</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handy person (frequent use)</td>
<td>3</td>
<td>10</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Professional (Heavy duty use)</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
Lead users

• Customers who experience needs months or years ahead of the majority of the marketplace and stand to benefit substantially from product innovations.
Eliciting Customer Needs

- ‘Walk us through’ a typical session using the product.
- What do you like about the existing products?
- What do you dislike about the existing products?
Eliciting Customer Needs (cont)

• What issues do you consider when purchasing the product?
• What improvements would you make to the product?
Tips

• ‘Go with the flow’
• Use visual stimuli and props
• Suppress preconceived hypotheses about product technology
• Have customer demonstrate product use and/or product-related tasks
Tips (cont)

- Be alert for surprises and the expression of latent needs
- Watch for non-verbal information
Documenting Customer Interactions

• Audiotape recording
• Notes
• Videotape recording
• Still photography

Remember to write thank you notes to customers who provide data on their needs.
Interpret Raw Customer Data

Tips for interpreting raw customer data in terms of ‘customer needs’

• Express needs in terms of what the product must do, not how it might do it.
• Express needs as specifically as in the raw data
• Use positive not negative phrasing
• Avoid the words ‘must’ and ‘should’
<table>
<thead>
<tr>
<th>Guideline</th>
<th>Customer Statement</th>
<th>Need Statement-Wrong</th>
<th>Need Statement-Right</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What Not How</strong></td>
<td>“Why don’t you put protective shields around the battery contacts?”</td>
<td>The screwdriver battery contacts are covered by a plastic sliding door.</td>
<td>The screwdriver battery is protected from accidental shorting.</td>
</tr>
<tr>
<td><strong>Specificity</strong></td>
<td>“I drop my screwdriver all the time.”</td>
<td>The screwdriver is rugged.</td>
<td>The screwdriver operates normally after repeated dropping.</td>
</tr>
<tr>
<td><strong>Positive Not Negative</strong></td>
<td>“It doesn’t matter if it’s raining, I still need to work outside on Saturdays.”</td>
<td>The screwdriver is not disabled by the rain.</td>
<td>The screwdriver operates normally in the rain.</td>
</tr>
<tr>
<td><strong>Attribute of the Product</strong></td>
<td>“I’d like to charge my battery from my cigarette lighter.”</td>
<td>An automobile cigarette lighter adapter can charge the screwdriver battery.</td>
<td>The screwdriver battery can be charged from an automobile cigarette lighter.</td>
</tr>
<tr>
<td><strong>Avoid “Must” and “Should”</strong></td>
<td>“I hate it when I don’t know how much juice is left in the batteries of my cordless tools.”</td>
<td>The screwdriver should provide an indication of the energy level of the battery.</td>
<td>The screwdriver provides an indication of the energy level of the battery.</td>
</tr>
</tbody>
</table>
Visual Information: Book Bag Design
Needs Translation Exercise: Book Bag Design Example

1. “See how the leather on the bottom of the bag is all scratched; it’s ugly.”
2. “When I’m standing in line at the cashier trying to find my checkbook while balancing my bag on my knee, I feel like a stork.”
3. “This bag is my life; if I lose it I’m in big trouble.”
4. “There’s nothing worse than a banana that’s been squished by the edge of a textbook.”
5. “I never use both straps on my knapsack; I just sling it over one shoulder.”
Organizing needs

Organize needs as a hierarchy

- Print or write each need statement on a separate card or ‘Post-It’
- Eliminate redundant statements
- Group cards according to the similarity of expressed needs
Organizing needs (cont)

- For each group, choose a label
- Consider creating “supergroups” consisting of two to five groups
- Review and edit need statements
Relative importance of needs

Cordless Screwdriver Survey

For each of the following cordless screwdriver features, please indicate on a scale of 1 to 5 how important the feature is to you. Please use the following scale:

1. Feature is undesirable. I would not consider a product with this feature.
2. Feature is not important, but I would not mind having it.
3. Feature would be nice to have, but is not necessary.
4. Feature is highly desirable, but I would consider a product without it.
5. Feature is critical. I would not consider a product without this feature.

1. The screwdriver can drive screws into hardwood.
2. The screwdriver can turn phillips, torx, socket, and hex head screws.
3. The screwdriver can access screws at the end of deep, narrow holes.

And so forth.
The SD provides plenty of power to drive screws.
* The SD maintains power for several hours of heavy use.
** The SD can drive screws into hardwood.
The SD drives sheet metal screws into metal ductwork.
*** The SD drives screws faster than by hand.

The SD makes it easy to start a screw.
* The SD retains the screw before it is driven.
!* The SD can be used to create a pilot hole.

The SD works with a variety of screws.
** The SD can turn philips, torx, socket, and hex head screws.
** The SD can turn many sizes of screws.

The SD can access most screws.
The SD can be maneuvered in tight areas.
** The SD can access screws at the end of deep, narrow holes.

The SD turns screws that are in poor condition.
The SD can be used to remove grease and dirt from screws.
The SD allows the user to work with painted screws.
The SD feels good in the user's hand.
*** The SD is comfortable when the user pushes on it.
*** The SD is comfortable when the user resists twisting.
* The SD is balanced in the user's hand.
! The SD is equally easy to use in right or left hands.
The SD weight is just right.
The SD is warm to touch in cold weather.
The SD remains comfortable when left in the sun.

The SD is easy to control while turning screws.
*** The user can easily push on the SD.
*** The user can easily resist the SD twisting.
The SD can be locked "on."
!** The SD speed can be controlled by the user while turning a screw.
* The SD remains aligned with the screw head without slipping.
** The user can easily see where the screw is.
* The SD does not strip screw heads.
* The SD is easily reversible.
The SD is easy to set-up and use.
* The SD is easy to turn on.
* The SD prevents inadvertent switching off.
* The user can set the maximum torque of the SD.
! The SD provides ready access to bits or accessories.
* The SD can be attached to the user for temporary storage.

The SD power is convenient.
* The SD is easy to recharge.
  The SD can be used while recharging.
*** The SD recharges quickly.
  The SD batteries are ready to use when new.
!** The user can apply torque manually to the SD to drive a screw.

The SD lasts a long time.
** The SD tip survives heavy use.
  The SD can be hammered.
* The SD can be dropped from a ladder without damage.
The SD is easy to store.
* The SD fits in a toolbox easily.
** The SD can be charged while in storage.
   The SD resists corrosion when left outside or in damp places.
! The SD maintains its charge after long periods of storage.
   The SD maintains its charge when wet.

The SD prevents damage to the work.
* The SD prevents damage to the screw head.
   The SD prevents scratching of finished surfaces.

The SD has a pleasant sound when in use.

The SD looks like a professional quality tool.

The SD is safe.
   The SD can be used on electrical devices.
*** The SD does not cut the user's hands.
Reflect on results and process

• Have we interacted with all of the important types of customers in our target market?
• Can we see beyond needs relating to existing products to capture latent needs?
• Are there areas of inquiry we should pursue in follow-up interviews or surveys?
Reflect on results and process (cont)

• Which of the customers we spoke to would be good participants in our on-going development efforts?
• What do we know now that we didn't know when we started?
• Are we surprised by any of the needs?
Reflect on results and process (cont)

• Did we win the cooperation of everyone within our own organization who needed to deeply understand customer needs?
• How might we improve the process in future efforts?
Caveats

- Capture “What, Not How”.
- Meet customers in the use environment.
- Collect visual, verbal, and textual data.
- Props will stimulate customer responses.
- Interviews are more efficient than focus groups but give less information.
Caveats (cont)

• Interview all stakeholders and lead users.
• Develop an organized list of need statements.
• Look for latent needs.
• Survey to quantify tradeoffs.
• Make a video to communicate results…
Summary
Process of identifying customer needs involves five steps

• 1. Gather raw data from customers
• 2. Interpret the raw data in terms of customer needs
• 3. Organize the needs into hierarchy
• 4. Establish the relative importance of the needs
• 5. Reflect on the results and the process